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$\mathrm{O}(d+1,d+1)$ enhanced double field theory

Olaf Hohm,[a] **Edvard T. Musaev**[b,c] **and Henning Samtleben**[d]

[a] *Simons Center for Geometry and Physics, Stony Brook University, Stony Brook, NY 11794-3636, U.S.A.*

[b] *Max-Planck-Institut für Gravitationsphysik (Albert-Einstein-Institut), Am Mühlenberg 1, DE-14476 Potsdam, Germany*

[c] *General Relativity Department, Institute of Physics,Kazan Federal University, Kremlevskaya 16a, 420111, Kazan, Russia*

[d] *Univ Lyon, ENS de Lyon, Univ Claude Bernard Lyon 1, CNRS, Laboratoire de Physique, F-69342 Lyon, France*

E-mail: ohohm@scgp.stonybrook.edu, edvard.musaev@aei.mpg.de, henning.samtleben@ens-lyon.fr

Abstract: Double field theory yields a formulation of the low-energy effective action of bosonic string theory and half-maximal supergravities that is covariant under the T-duality group $\mathrm{O}(d,d)$ emerging on a torus T^d. Upon reduction to three spacetime dimensions and dualisation of vector fields into scalars, the symmetry group is enhanced to $\mathrm{O}(d+1,d+1)$. We construct an enhanced double field theory with internal coordinates in the adjoint representation of $\mathrm{O}(d+1,d+1)$. Its section constraints admit two inequivalent solutions, encoding in particular the embedding of $D=6$ chiral and non-chiral theories, respectively. As an application we define consistent generalized Scherk-Schwarz reductions using a novel notion of generalized parallelization. This allows us to prove the consistency of the truncations of $D=6$, $\mathcal{N}=(1,1)$ and $D=6$, $\mathcal{N}=(2,0)$ supergravity on $\mathrm{AdS}_3\times\mathbb{S}^3$.

Keywords: Bosonic Strings, M-Theory, String Duality, String Field Theory

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